

What is claimed is:

1. A fuel vapor leakage inspection apparatus comprising:

a fuel tank;

an adsorption container, wherein said adsorption container

5 houses an adsorbent for adsorbing fuel vapor generated in the fuel tank;

an exhaust device for stopping and starting communication between the adsorption container and an intake pipe, wherein the exhaust device is provided in an exhaust path for exhausting fuel 10 vapor adsorbed by the adsorbent into the intake pipe by a negative pressure of the intake pipe;

pressure means for pressurizing or depressurizing a fuel vapor path formed from the fuel tank through the adsorption container to the exhaust device while the exhaust device blocks 15 communication between the adsorption container and the intake pipe;

leakage detection means for detecting leakage from the fuel vapor path after the fuel vapor path is pressurized or depressurized by the pressure means;

20 calculation means for calculating an amount of fuel vapor adsorbed; and

control means for determining whether or not the pressure means is operated to execute a leakage inspection for the fuel vapor path in accordance with the amount of the fuel vapor 25 calculated by the calculation means.

2. The fuel vapor leakage inspection apparatus according

to claim 1, wherein the calculation means calculates the amount of the fuel vapor adsorbed by the adsorbent based on any one of a previous amount of the fuel vapor exhausted into the intake pipe, a concentration of the fuel vapor, and an amount of a deviation 5 in air-fuel ratio generated by exhausting the fuel vapor.

3. The fuel vapor leakage inspection apparatus according to claim 1, wherein the calculation means calculates the amount of the fuel vapor adsorbed by the adsorbent based on at least one 10 of an amount of a fuel in the fuel tank prior to the leakage inspection, a fuel temperature, and a shutdown time period of an internal combustion engine.

4. A fuel vapor leakage inspection apparatus for 15 inspecting leakage of a fuel vapor in a fuel vapor processing system including:

a fuel tank;
an adsorption container, wherein the adsorption container houses an adsorbent for adsorbing the fuel vapor generated in the 20 fuel tank;

an exhaust device for stopping and starting communication between the adsorbing container and an intake pipe, wherein the exhaust device is provided in an exhaust path for exhausting the fuel vapor adsorbed by the adsorbent into the intake pipe by a 25 negative pressure of the intake pipe;

pressure means for pressurizing or depressurizing a fuel vapor path formed from the fuel tank through the adsorption

container to the exhaust device while the exhaust device is blocking the communication between the adsorption container and the intake pipe;

5 leakage detection means for detecting leakage from the fuel vapor path after the fuel vapor path is pressurized or depressurized by the pressure means;

 fuel feeding detection means for detecting fuel feeding to the fuel tank; and

10 control means for stopping the leakage inspection when the fuel feeding detection means detects the fuel feeding to the fuel tank.

5. The fuel vapor leakage inspection apparatus according to claim 4, wherein

15 the control means stops the leakage inspection until a vehicle engine starts running under a predetermined condition after the fuel feeding to the fuel tank.

20 6. A fuel vapor leakage inspection apparatus for inspecting leakage of a fuel vapor in a fuel vapor processing system including:

 a fuel tank;

25 an adsorption container, wherein the adsorption container houses an adsorbent for adsorbing fuel vapors generated in the fuel tank;

 an exhaust device for stopping and starting communication between the adsorbing container and an intake pipe, wherein the

exhaust device is provided in an exhaust path for exhausting the fuel vapor, adsorbed by the adsorbent, into the intake pipe by a negative pressure of the intake pipe;

pressure means for pressurizing or depressurizing a fuel vapor path formed from the fuel tank through the adsorption container to the exhaust device while the exhaust device is blocking the communication between the adsorption container and the intake pipe;

leakage detection means for detecting leakage from the fuel vapor path after the fuel vapor path is pressurized or depressurized by the pressure means;

concentration measurement means for measuring a concentration of the fuel vapor, wherein the concentration measurement means is provided on an atmosphere side of the adsorbent; and

control means for stopping the leakage inspection when the concentration measurement means detects the fuel vapor.

7. A fuel vapor leakage inspection apparatus for inspecting leakage of a fuel vapor in a fuel vapor processing system including: a fuel tank; an adsorption container housing a first adsorbent for adsorbing the fuel vapor generated in the fuel tank; and an exhaust device for stopping and starting communication between the adsorbing container and an intake pipe, provided in an exhaust path for exhausting the fuel vapor adsorbed by the first adsorbent into the intake pipe by a negative pressure of the intake pipe, the fuel vapor leakage inspection apparatus

comprising:

5 pressure means for pressurizing or depressurizing a fuel vapor path formed from the fuel tank through the adsorption container to the exhaust device while the exhaust device is blocking the communication between the adsorption container and the intake pipe;

10 leakage detection means for detecting leakage from the fuel vapor path after the fuel vapor path is pressurized or depressurized by the pressure means;

15 a second adsorbent for adsorbing the fuel vapor, the second adsorbent provided upstream of a throttle device provided in the intake pipe; and

15 a connection pipe for connecting the intake pipe and an atmosphere side of the pressure means with each other, the connection pipe positioned between the second adsorbent and a combustion chamber of an internal combustion engine.

8. A fuel vapor leakage inspection apparatus for inspecting leakage of a fuel vapor in a fuel vapor processing system including: a fuel tank; an adsorption container housing an adsorbent for adsorbing the fuel vapor generated in the fuel tank; and an exhaust device for stopping and starting communication between the adsorbing container and an intake pipe, provided in an exhaust path for exhausting the fuel vapor adsorbed by the adsorbent into the intake pipe by a negative pressure of the intake pipe, the fuel vapor leakage inspection apparatus comprising:

pressure means for pressurizing or depressurizing a fuel vapor path formed from the fuel tank through the adsorption container to the exhaust device while the exhaust device is blocking the communication between the adsorption container and
5 the intake pipe;

leakage detection means for detecting leakage from the fuel vapor path after the fuel vapor path is pressurized or depressurized by the pressure means; and

10 a sealed container connected to an atmosphere side of the pressure means.

9. The fuel vapor leakage inspection apparatus according to claim 8, further comprising negative-pressure means for making a pressure in the sealed container negative prior to the
15 pressurization or depressurization of the fuel vapor path by the pressure means.

10. The fuel vapor leakage inspection apparatus according to claim 9, wherein the negative-pressure means is the pressure
20 means.

11. The fuel vapor leakage inspection apparatus according to claim 9, wherein the negative-pressure means is a negative pressure in the intake pipe.

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12. The fuel vapor leakage inspection apparatus according to claim 8, wherein the sealed container has a variable volume.

13. A fuel vapor leakage inspection apparatus comprising:
pressure means for pressurizing or depressurizing a fuel
vapor path and a reference orifice serving as a reference for
determining leakage from the fuel vapor path, the fuel vapor path
being formed from a fuel tank through an adsorption container to
an exhaust device, while the exhaust device is blocking
communication between the adsorption container and an intake
pipe;

10 pressure measurement means for measuring pressure in the
reference orifice and the fuel vapor path; and

control means for measuring a path pressure in the fuel
vapor path pressurized or depressurized by the pressure means
with the pressure measurement means after measurement of a first
15 reference orifice pressure in the reference orifice pressurized
or depressurized by the pressure means with the pressure
measurement means to compare the first reference orifice pressure
and the path pressure with each other to determine the leakage
from the fuel vapor path,

20 wherein the pressure measurement means measures a second
reference orifice pressure of the reference orifice pressurized
or depressurized again by the pressure means in the case where
there is a possibility that leakage occurs from the fuel vapor
path as a result of comparison between the first reference orifice
25 pressure and the path pressure by the control means, and the
control means stops the leakage determination of the fuel vapor
path if the amount of a change in pressure between the first

reference pressure and the second reference orifice pressure is a predetermined value or larger.

14. A fuel vapor leakage inspection apparatus for inspecting leakage of a fuel vapor in a fuel vapor processing system, the fuel vapor leakage inspection apparatus comprising:

5 pressure means for pressurizing or depressurizing a fuel vapor path and a reference orifice serving as a reference for determining leakage from the fuel vapor path, wherein the fuel vapor path is formed from a fuel tank through an adsorption container to an exhaust device, while the exhaust device is blocking communication between the adsorption container and an 10 intake pipe;

15 pressure measurement means for measuring pressures in the reference orifice and the fuel vapor path; and

control means for measuring a path pressure in the fuel vapor path pressurized or depressurized by the pressure means with the pressure measurement means after measurement of a first reference orifice pressure in the reference orifice pressurized 20 or depressurized by the pressure means with the pressure measurement means to compare the first reference orifice pressure and the path pressure with each other to determine leakage from the fuel vapor path,

25 wherein the pressure measurement means measures a second reference orifice pressure in the reference orifice pressurized or depressurized again by the pressure means in a case where there is a possibility that leakage occurs from the fuel vapor path as

a result of comparison between the first reference orifice pressure and the path pressure by the control means, and the control means corrects the path pressure in accordance with the amount of a change in pressure between the first reference orifice pressure and the second reference orifice pressure so as to 5 determine leakage from the fuel vapor path.

15. A fuel vapor leakage inspection apparatus comprising:
pressure means for pressurizing or depressurizing a fuel
10 vapor path formed from a fuel tank through an adsorption container
to an exhaust device while the exhaust device is blocking
communication between the adsorption container and an intake
pipe;

15 pressure measurement means for measuring a path pressure
in the fuel vapor path;

concentration measurement means for measuring a
concentration of a fuel vapor, wherein the concentration
measurement means is provided on an atmosphere side of the
adsorbent; and

20 control means for determining leakage from the fuel vapor
path based on the path pressure in the fuel vapor path pressurized
or depressurized by the pressure means, the path pressure being
measured by the pressure measurement means,

25 wherein the control means stops the leakage determination
if the concentration of the fuel vapor measured by the
concentration measurement means is a predetermined value or
larger in a case where there is a possibility that leakage occurs

from the fuel vapor path.

16. A fuel vapor leakage inspection apparatus for inspecting leakage of a fuel vapor in a fuel vapor processing system including a fuel tank; an adsorption container housing an adsorbent for adsorbing the fuel vapor generated in the fuel tank; and an exhaust device for stopping and starting communication between the adsorbing container and an intake pipe, provided in an exhaust path for exhausting the fuel vapor adsorbed by the adsorbent into the intake pipe by a negative pressure of the intake pipe, the fuel vapor leakage inspection apparatus comprising:

pressure means for pressurizing or depressurizing a fuel vapor path formed from the fuel tank through the adsorption container to the exhaust device while the exhaust device is blocking the communication between the adsorption container and the intake pipe;

pressure measurement means for measuring a path pressure in the fuel vapor path;

20 concentration measurement means for measuring a concentration of the fuel vapor, provided on an atmosphere side of the adsorbent; and

25 control means for determining leakage from the fuel vapor path based on the path pressure of the fuel vapor path pressurized or depressurized by the pressure means, the path pressure being measured by the pressure measurement means,

wherein the control means corrects the path pressure in

accordance with the fuel vapor concentration measured by the concentration measurement means when the pressure means depressurizes the fuel vapor path or depressurizes the fuel vapor path after the pressure means pressurizes the fuel vapor path,
5 and executes leakage determination from the fuel vapor path.

17. The fuel vapor leakage inspection apparatus according to claim 16, further comprising:

calculation means for calculating an amount of fuel vapor adsorbed by the adsorbent, wherein the control means determines whether or not to operate the pressure means to execute leakage inspection for the fuel vapor path in accordance with the amount of the fuel vapor calculated by the calculation means.

15 18. The fuel vapor leakage inspection apparatus according to claim 16, further comprising:

fuel feeding detection means for detecting fuel feeding to the fuel tank, wherein the control means stops leakage inspection when the fuel-feeding detection means detects the fuel feeding
20 to the fuel tank.

19. The fuel vapor leakage inspection apparatus according to claim 16, further comprising:

a throttle device, wherein the throttle device is provided
25 in the intake pipe;

an intake adsorbent for adsorbing the fuel vapor, wherein the intake adsorbent is provided upstream of the throttle device;

and

a connection pipe for connecting the intake pipe positioned between the intake adsorbent and a combustion chamber of an internal combustion engine, and an atmosphere side of the pressure means with each other.

20. The fuel vapor leakage inspection apparatus according to claim 16, further comprising:

a sealed container connected to an atmosphere side of the pressure means.